

MASTER THESIS

'Predictors of self-reliance of older people with a chronic illness receiving home-care': A Prognostic Study

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Summary

Background

Most older people wish to remain living at home as long as possible. Being able to perform daily activities and self-reliance are important conditions for older people to achieve this. Evidence regarding predictors of self-reliance in chronically ill older people receiving home-care is lacking.

Aims

The primary objective is to determine the predictors of self-reliance of patients with a chronic illness receiving home-care at six months follow-up. The secondary objective is to compare characteristics of patients with a chronic illness receiving home-care at six months follow-up, with those who are completely independent and do not receive home-care anymore.

Methods

A prognostic study with six months follow-up. Patient information regarding demographics, nursing diagnosis, amount of care, nurses and unplanned hospitalization were extracted from electronic patient files, used by a large long-term care organization in the east of the Netherlands. Multiple logistic regression analysis was performed to determine predictors of self-reliance.

Results

In total, data was collected from 216 patients, of which 127 patients were independent at six months follow-up. Four factors appear to predict self-reliance. Male (Odds Ratio (OR):1,411[95%Confidence Interval (CI):0,78-2,57]), number of actual nursing diagnosis (OR:0,80[95%CI:0,68-0,94]), problems in the psychosocial domain (OR:1,65[95%CI:0,89-3,05]) and problems in the physiological domain (OR:6,95[95%CI:1,54-31,23])

Conclusions

The number of nursing diagnosis is the strongest predictor, reducing the chance of self-reliance after six months, followed by problems in the physiological and psychological domain. Being male seems to increase the chance of self-reliance.

Recommendations

More research is needed to understand which patient-characteristics, -problems and social circumstances influence self-reliance among older people with a chronic illness receiving home-care. Subsequently, interventions can be recommended to stimulate home-care that focusses on improving self-reliance of older people.

Keywords: Older People, Chronic Disease, Home Care Services, Self-reliance, Prediction

Samenvatting

Achtergrond

De meeste ouderen willen zo lang mogelijk thuis blijven wonen. Het kunnen uitvoeren van activiteiten van het dagelijks leven en zelfredzaamheid zijn belangrijke voorwaarden om dit te bereiken. Kennis over voorspellers van zelfredzaamheid van chronisch zieke ouderen die wijkverpleging ontvangen ontbreekt nog.

Doelstellingen

Het primaire doel is om de voorspellers van zelfredzaamheid van patiënten met een chronische ziekte die wijkverpleging ontvangen te bepalen, na zes maanden follow-up. Het secundaire doel is om kenmerken van patiënten met een chronische ziekte die nog wijkverpleging ontvangen na zes maanden te vergelijken met degenen die volledig zelfredzaam zijn en geen wijkverpleging meer ontvangen.

Methode

Een prognostische studie met zes maanden follow-up. Patiëntinformatie uit elektronische patiëntendossiers van een grote zorgorganisatie in het oosten van Nederland met betrekking tot demografische gegevens, verpleegkundige diagnoses, hoeveelheid zorg, verpleegkundigen en ongeplande ziekenhuisopname werd gebruikt. Multipole logistische regressieanalyse werd uitgevoerd om voorspellers van zelfredzaamheid te bepalen.

Resultaten

Gegevens werden verzameld bij 216 patiënten, waarvan 127 patiënten zelfredzaam waren na zes maanden. Vier factoren lijken de zelfredzaamheid te voorspellen. Geslacht man (Odds Ratio(OR): 1.411 [95% Betrouwbaarheidsinterval(BI): 0,78-2,57]), aantal actuele verpleegkundige diagnoses (OR: 0,80 [95% BI: 0,68-0,94]), problemen in het psychosociale domein (OR: 1,65 [95% BI: 0,89-3,05]) en problemen in het fysiologische domein (OR: 6,95 [95% BI: 1,54- 31,23])

Conclusies

Het aantal verpleegkundige diagnoses is de sterkste voorspeller waardoor de kans op zelfredzaamheid na zes maanden afneemt, gevolgd door problemen in het fysiologische en psychologische domein. Man zijn lijkt de kans op zelfredzaamheid te vergroten.

Aanbevelingen

Om te begrijpen welke patiëntkenmerken, -problemen en sociale omstandigheden zelfredzaamheid van chronisch zieke ouderen die wijkverpleging ontvangen voorspellen is meer onderzoek nodig. Vervolgens kunnen interventies worden aanbevolen om wijkverpleging te stimuleren die zich richt op het verbeteren van de zelfredzaamheid van ouderen.

Sleutelwoorden: Ouderen, Chronisch Zieken, Wijkverpleging, Zelfredzaamheid, Predictie

Introduction

The impact of demographic ageing will be of major significance in the coming years. In 2017 almost one fifth of the European population was aged over sixty-five years¹. The demands for health care services will grow and costs will rise^{2,3}, because people who live to an older age are more often suffering from (multiple) chronic illness and are more likely to be disabled and in need of caregiver assistance⁴. They also have a high risk of functional decline and frailty^{5,6}.

Functional decline means losing the ability of performing activities of daily living⁷ and is an important threat to living independently and remaining self-reliant⁶. It can be predicted by a variety of factors^{6,8,9}. Among these are demographic, medical and social factors, such as age, gender, medical diagnoses and social environment^{6,8,9}. Frailty is defined as an increased vulnerability to everyday stressors, caused by cumulative decline of multiple physiological systems, leading to an increased risk of adverse outcomes such as losing the ability to live independently¹⁰.

Despite being frail and/or suffering from functional decline, most older people wish to remain living at home as long as possible¹¹⁻¹⁴. Being able to perform daily activities^{14,15} and self-reliance^{12,16} are important conditions for older people to achieve this. Self-reliance is the ability of people to take care of themselves in all areas of life with the least possible professional care, or being able to take care of themselves with the help of informal caregivers¹⁷. Self-reliance can be defined as a nurse sensitive patient outcome, i.e. it can be significantly and measurably influenced by nursing care¹⁸.

District nurses have an important role to support older people stay self-reliant as long as possible¹⁹. The role of the district nurse is a complex role, which varies in many (European) countries. It requires a high level of flexibility and diversity in knowledge and skills²⁰. It involves the assessment, organization and delivery of care to people with complex care needs living in their own homes. The work of the district nurse includes responsibility for providing nursing care focussing on promoting and maintaining the health of individuals and families^{19,20}. Unfortunately, there is a scarcity of district nurses at the moment^{21,22}.

To ensure quality of care for every citizen when facing shortage of health care professionals and resources, it is of great importance that home-care is provided as efficiently and effective as possible^{23,24}. It should be aimed at supporting older people to continue feeling autonomous in their own homes¹⁴. This requires knowledge regarding what patient characteristics and specific diagnoses of those receiving home care predict self-reliance in this population. To develop interventions aimed at supporting self-reliance, a better comprehension of the differences between characteristics of people who are and are not self-reliant is necessary as well.

There is evidence available regarding the potential of nursing diagnoses to predict patient outcomes, such as self-reliance²⁵ and the positive influence of complex nursing interventions like reablement, on maintaining independence in older people^{26–29}. Reablement is a method that offers intensive, time-limited, multidisciplinary, person-centred and goal-directed home-care services targeted at maximizing independence³⁰. Furthermore, studies were conducted to determine predictors of home-care utilization and societal costs of older-care^{31,32}.

However, evidence regarding predictors of self-reliance in chronically ill older people receiving home-care is lacking.

Identification of predictors of self-reliance enables a better understanding of what influences self-reliance and may help home-care organizations to make a more targeted contribution to self-reliance of older people.

Therefore, the aim of this study is to determine predictors of self-reliance of patients with a chronic illness receiving home-care at six months follow-up. The secondary aim is to compare characteristics of patients with a chronic illness receiving home-care at six months follow-up, with those who are completely independent and do not receive home-care anymore.

Method

Design

This study was conducted according to a prognostic cohort design with six months follow-up. Routine care data from a large long-term care organization in the east of the Netherlands were used. The organization provides home-care, with a turnover of approximately 4000 patients per year and employs about 120 district nurses. The study took place from January 2019 until June 2019.

Population

Older people, aged over 60 years, with a chronic illness who received home-care. A patient with at least one chronic illness such as diabetes or Chronic Obstructive Pulmonary Disease (COPD), was included in the target group chronic illness³³.

Eligible patients had to be admitted for home-care in the period of January 2018 until June 2018 and there had to be an evaluation after six months included in the Electronic Patient File (EPF). The six-month time window was chosen to have at least follow-up data available from this period. Participants were excluded from participation, when the patient was classified in target group dementia and/or the patient had a nursing-home indication. Patients who were transferred to a long-term care facility or patients who died during six months follow-up were lost to follow-up.

Primary outcome

The primary outcome of this study is complete self-reliance of patients who received home care, after six months. This was measured by checking whether the status of the patient in the EPF was adjusted to terminated care within six months (yes/no).

Secondary outcome

The secondary outcome is to compare characteristics of patients who were not completely self-reliant after six months follow-up and were receiving home-care and patients who were independent and not receiving home-care anymore after six months.

Candidate predictors

Candidate predictors were chosen based on literature^{25,34-36}, supplemented with clinical reasoning.

Demographics

Candidate predictors are *age* (>60), *gender* (male/female), *living status* (alone/with other), *number of medical diagnosis*, *presence of informal caregiving* (yes/no) and *intensity of informal caregiving* (daily, weekly, less than weekly present).

Additional demographics are *marital status* (married, divorced, widow(er), never married), *presence of informal caregivers* (yes/no) and the *type of informal caregiver* (partner, child, other). Medical diagnosis included in the analysis are COPD, Heart failure, Diabetes Mellitus, Cancer, Multiple Sclerosis/ Amyotrophic Lateral Sclerosis, Kidney disease, Rheumatism, Stroke and other.

Nursing Diagnosis

Nursing Diagnosis (ND) are the basis to identify appropriate nursing interventions and can help achieve and explain relevant outcomes, such a self-reliance^{25,37}.

Information regarding ND was obtained using the Omaha problem classification scheme, consisting of four domains: environmental, psychosocial, physiological and health-related behaviours domain³⁸. Information was gathered regarding the different domains of actual and potential ND incorporated in the nursing care plan of the patient. An actual diagnosis needs action right away, a potential diagnosis needs monitoring to prevent it from becoming an actual diagnosis³⁸.

Amount of care

Increase of amount of care in minutes per week within the period of six months was collected as a dichotomous variable (yes/no). It is an indication of unanticipated case complexity when the amount of care has increased more than once during the study period^{34,35}.

The *increase and decrease in amount of care*, in minutes per week, were included as a continuous variable to get insight in the magnitude of change of amount of care granted per week. This was calculated by using the assigned amount of care at baseline and at six months follow-up.

The *total amount of care delivered* is the total amount of care delivered, in average minutes per week, over the period of care or six months.

Nurses

The *level of education of the nurses* can vary between Auxiliary Nurse (AN), Registered Practical Nurse (RPN) or Registered Nurse (RN) and is presented as percentages of time the care is mainly given by each level of nurses. Also, the *number of different nurses per patient* during the care-period was calculated.

Other

Unplanned hospitalization within the period of six months was collected as a dichotomous variable (yes/no).

Sample size

For every independent variable selected as predictor, there must be at least ten outcomes or patients included in the study³⁹⁻⁴¹.

Ten predictors were investigated, meaning that for at least 100 patients care had to be terminated within six months and at least 100 patients still had to receive care after six months, resulting in a sample size of a minimum of 200 patients.

Procedures and quality

Consecutive sampling was used to select eligible patients (figure 1). To prevent selection bias, every new patient admitted for home-care in the period of January 2018 until June 2018, who met inclusion criteria, was selected for participation. Patient information and informed consent forms were sent to 216 eligible patients. To reduce the risk of missing data, patients who did not respond the first time received a reminder containing the patient information and consent forms.

[Figure 1]

Data collection

Data were collected by the principal investigator (RG). Interpretation of the data was discussed with a second investigator (NB). Anonymous data could be automatically generated from the EPF. The EPF was based on the Omaha System (OS), an assessment, intervention and evaluation framework³⁸. The component of the OS that was used is the problem classification scheme, by which the nurse can assess the patient³⁸. Candidate predictors, additional characteristics and outcome measures were collected for all eligible patients. Data which could not be generated automatically, were extracted by hand from the EPF of the patients who gave consent.

Baseline data and candidate predictors were collected when a patient was admitted for home-care, outcome and other data were collected at six months follow-up or when care was terminated.

Data analysis

Data were entered and analysed in SPSS version 25 (IBM Corp. 2017, Armonk, NY). Continuous characteristics are presented with means and standard deviation in case of normal distributed data or with medians and interquartile ranges when data are non-normally distributed. Categorical and dichotomous variables are expressed as counts and percentages. Candidate predictors consist of dichotomous, categorical and continuous data. To prepare the predictors to be used in the regression model, categorical predictors were coded with dummy variables. First, data were checked for meeting the assumptions of logistic regression⁴¹. Independence of errors was investigated by checking if no paired data were used. The absence of multicollinearity was investigated by plotting a correlation matrix. If variables were correlated (tolerance $< 0,1^{42}$), both were not included in the model. Outliers and other errors were detected by creating boxplots and frequency tables for the predictors individually.

The number of missing data was checked, 11% of the data regarding candidate predictors is missing.

Statistical uncertainty is expressed in 95% confidence intervals (CI). $P < 0,05$ is considered statistically significant.

Primary outcome

First, univariate logistic regression analysis was performed. Odds Ratios (OR) with 95% CI were calculated. Second, a multivariate backward logistic regression was performed to determine predictors of self-reliance. For the level of significance Akaike's information

criterion was used to reduce the risk of overfitting. According to Akaike, if a p-value is $<0,157$ the predictor can be included in the model⁴³.

Model performance

The logistic regression model was validated internally, to make an estimation of the performance of the model in other patients and to correct for overfitting and optimistic results⁴⁴. Discrimination was assessed by the area under the receiver operating curve. The goodness of fit was assessed using the Hosmer-Lemeshow test and Nagelkerke R^2 to assess the accuracy of the model⁴⁴.

Secondary outcome

Descriptive statistics were performed to compare the characteristics of patients with a chronic illness still receiving home-care at six months follow-up, with those who are completely independent.

Ethical issues

The study was conducted according to the principles of the Declaration of Helsinki (version October 2013)⁴⁵ in accordance with the Wet op de Geneeskundige Behandelingsovereenkomst⁴⁶. To this study the Medical Research Involving Human Subjects Act is not applicable⁴⁷. Permission for this study was granted by the METC UMC Utrecht on January 29 2019 (protocol ID 19-059/C).

Data were used anonymously so it could not be traced back to the individual subject. Regulations regarding the General Data Protection Regulation^{48,49} were followed.

Results

Participants and baseline characteristics

A total of 216 patients met inclusion criteria and were included in the study. Ninety Patients gave consent to access the EPF to collect additional data. The mean age of the population was 78,3 years and 108 patients were female (50%). Most patients were living with someone (58,5%) and were married or had a partner (60%). Most patients had daily access to informal care (56,8%). Informal care was mainly provided by a partner (39,7%) or a child (43,6%). For 127 patients (59%), home-care was terminated within six months. Baseline characteristics are provided in table 1.

[Table 1]

Predictors of self-reliance

Five significant predictors remain after univariate logistic regression analysis (table 2). Number of actual ND ($p=0,001$), problems in the psychosocial domain ($p=0,009$), problems in the physiological domain ($p=0,001$), problems in the health behaviours domain ($p=0,010$) and number of problems in the care plan ($p=0,001$).

Multivariate regression analysis showed that four predictors remain in the final model (table 3). Gender (OR:1,411[95%CI:0,78-2,57]), number of actual ND (OR:0,80[95%CI:0,68-0,94]), problems in the psychosocial domain (OR:1,65[95%CI:0,89-3,05]) and problems in the physiological domain (OR:6,95[95%CI:1,54-31,23]). The area under the receiver operating curve is 0,311 (figure 1). The goodness of fit of the model, measured with the Hosmer-Lemeshow test, indicates no statistical significant difference between predicted and observed values ($\chi^2:6,04$, $df:7$, $p=0,53$). Nagelkerke R^2 had a value of 0,17, indicating that 17% of self-reliance can be predicted by the model.

[Figure 2]

[Table 2]

[Table 3]

Characteristics of self-reliant versus not self-reliant patients

Of the patients who were self-reliant, 75,7% returned to home-care within six months' time (table 1). Compared to patients who were not self-reliant, patients who were self-reliant were younger (77 vs 79 years old), more often male (53% vs 46%) and more often married (67% vs 53%). Informal caregiving was daily present in less cases (93% vs 96%) and more often provided by a partner (43% vs 37%).

The median length of care of self-reliant patients was 45 days, they received a median of 138 minutes per week of home-care. Patients who are not self-reliant received a median of 189 minutes per week of home-care. Within this group 25,6% was hospitalised within the period of home-care, compared to 12,5% of the self-reliant patients.

Diagnosis of COPD, diabetes, cancer, rheumatism and stroke were more often present among patients who were not self-reliant. In both groups, patients had most ND in the physiological domain, followed by the health behaviours domain, psychosocial domain and the environmental domain. The median number of ND incorporated in the care plan was higher within the group of patients who were not self-reliant (2,0), compared to the group who were self-reliant (1,0). In the last group home-care was mainly provided by RN (47,2%), home-care was mainly provided by AN in the group that was not self-reliant (53,4%).

Discussion

The results of this study showed that 59% of the included population was self-reliant after six months, however 75,7% of this group returned to care within six-months-time.

Four factors appear to predict self-reliance. The strongest predictor is a higher number of actual ND incorporated in the care-plan. This reduces the chance of self-reliance, as well as having ND in the physiological and the psychosocial domain. Being male increases the chance of self-reliance after six months and is the least strong predictor.

The chance to be self-reliant after six months is reduced by a higher number of ND incorporated in the care plan. In 1993, Helberg found similar results when studying patient's status at home-care discharge in the USA⁵⁰. The percentage of patients being independent at discharge was 61%, close to the 59% found in the present study. Patients with more nursing problems were less likely to be independent⁵⁰. Results of a study by Sanson et al (2017) are also broadly consistent with those of the current study and showed that ND have great potential to be an independent predictor of several patient-outcomes, such as length of stay and amount of nursing care in home-care settings²⁵.

The current study showed that ND in the physiological and the psychosocial domain predicted self-reliance after six months as well. Which diagnoses are responsible for this relationship is not yet clear. Van der Bulck et al (2018) found results confirming this outcome in a survey study among nurses in which they determined client characteristics predicting home-care needs. Results show that characteristics relate both to biomedical and psychosocial determinants⁵¹. The findings of that study provide more details on which problems were considered to predict home-care needs. However, their data were not extracted from patient files, so discrepancies could occur between the opinion of the nurses and daily practice. Furthermore, their outcome, home-care needs, does not correspond fully with the outcome of the current study, making comparison difficult.

Nursing problems in the health behaviours domain do not appear to predict self-reliance in this study. As opposed to results of a systematic review by Stuck et al (1999) where, for example, nutrition, medication, alcohol use and physical activity are considered to be risk factors of functional decline⁸. A possible reason for this result could be, that if a ND from the physiological domain causes several ND in the health behaviours domain, nurses can use one main problem from the physiological domain in the care plan, instead of a number of ND from the health behaviours domain. This makes estimating the contribution to self-reliance of ND in this domain more difficult.

Based on the results of the current study, being male was also a predictor of self-reliance. Results of previous studies correspond with this outcome, indicating that women will be

disabled longer before death than men who live to the same age^{4,52} and are more likely to experience symptoms in quality indicators, health, functional status and social and economic circumstances^{52,53}.

There were a few notable differences between patients who were and were not self-reliant. The last group received a larger amount of care, which could be explained by the presence of more severe chronic illnesses such as COPD and HF. Second, care was provided mainly by RN for patients who were self-reliant, compared to AN for those who were not self-reliant. Results of this study could not explain this difference.

This study has several strengths. First, to our knowledge, this is the first study that investigated predictors of self-reliance among older people receiving home-care, using routine care data from a home-care organization. Previous studies with data from patient files were conducted to define predictors of care intensity or societal costs^{25,31,32,54,55}, however none of these studied predictors of self-reliance. This, as well as the prospective design and the large sample size, make this a unique and valuable study giving first insights in factors predicting self-reliance. Last, self-reliance is an important patient outcome, because for older people living independently as long as possible in good psychosocial health is as important as living in good medical health⁵⁶. The results of this study are, therefore, relevant to these patients.

The results of this study should be interpreted in the light of several limitations. First, the study was conducted with routine care data from the OS, which reduces the internal validity and reliability of the outcomes. Nurses did receive a training in using the OS when the system was introduced, but did not receive a training as a part of this study. This originated in practice variation in performing assessments, constructing care plans, number of nursing diagnoses and amount of care assigned to patients. This raises the question whether data retrieved from the OS are valid to use in research. Second, the discrimination of the model is poor. However, the aim of this study was not to develop a prediction model, but to identify predictors of self-reliance. Nevertheless, this knowledge enables a better understanding of factors influencing self-reliance. Third, 11% of the data was missing. There were two causes of missing data. First, only 90 out of 216 patients gave consent to collect additional data from the EPF. Second, patient files were incomplete, resulting in missing data regarding marital and living status, unplanned hospitalization and all predictors concerning informal caregiving. These results must be interpreted with caution, because missing data cause bias and reduce precision and internal validity. Multiple imputation is a possible solution for this problem in upcoming studies. Last, data were collected in only one organization, causing poor generalizability of the results.

The results of this study indicate that several factors influence self-reliance. However, the exact nature of this influence is not yet clear. This study was a first exploration to determine which factors contribute to self-reliance of older people. Results are not detailed enough to recommend interventions to help home-care organizations make a more targeted contribution to improve self-reliance of older people. This implicates that future research should focus on determining predictors of self-reliance in more detail. Problems in the physiological and psychosocial domain appear to predict self-reliance, but this study does not answer the question which specific ND are responsible for this relationship.

As described earlier, reliability of the data is a possible source of weakness in this study. In general, data from the OS can be considered reliable for use in research^{57,58}. However, in a systematic review by Topaz et al (2013), it is stressed that researchers using data from the OS must pay extra attention to the nature and addressing of missing data and clearly describe limitations. Furthermore, nurses require education to reduce the amount of missing data or duplicate entries in future studies⁵⁹.

Several studies state that informal caregiving has an effect on older people living at home^{16,60-63}. It is notable that having an informal caregiver is not a predictor of self-reliance in this study. Therefore, it is important to investigate the contribution of factors regarding informal caregiving to self-reliance specifically in future research, including the influence of gender differences on this topic^{4,52}.

An unexpected outcome is the return of 75,7% of the self-reliant patients to home-care. This finding raises the important question whether the used nursing interventions and the decision to terminate care were accurate. To gain more insight in reasons for this relapse, characteristics of these patients must be investigated more closely, as are the used nursing interventions and decision to terminate care.

Conclusion

This is the first study aimed at identifying predictors of self-reliance of patients with a chronic illness receiving home-care. Of the four predictors, actual number of ND is the strongest predictor reducing the chance of self-reliance after six months, followed by problems in the physiological and psychosocial domain. The last and least strong predictor of self-reliance is being male. This seems to increase the chance of self-reliance.

Further research is necessary to explain the exact influence of each predictor on self-reliance. Studies should be designed to find out which patient-characteristics, -problems and social circumstances exactly predict self-reliance, before interventions can be recommended to help home-care organizations making a more targeted contribution to improve the self-reliance of older people.

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Tables and figures

Table 1 Baseline characteristics

	Population N = 216	Terminated Care N = 127 (59%)	No Terminated Care N = 89 (41%)
Demographics			
Age (years), mean(sd)	78,3 (8,9)	77,6 (8,9)	79,3 (8,9)
Female, n (%)	108 (50,0)	60 (47,2)	48 (53,9)
Marital status, n (%)			
0. Married/ partnership	57 (60,0)	34 (66,7)	23 (52,3)
1. Divorced	3 (2,0)	1 (2,0)	2 (4,7)
2. Never married	4 (4,2)	1 (2,0)	3 (6,8)
3. Widow(er)	31 (32,6)	15 (29,4)	16 (36,4)
Missing	121		
Living Status			
With other (yes), n (%)	48 (58,5)	23 (57,5)	25 (59,5)
Missing	133		
Presence of informal caregiving (yes), n (%)	107 (94,7)	54 (93,1)	53 (96,4)
Missing	103		
Intensity of informal caregiving, n (%)			
0. Daily presence	46 (56,8)	21 (55,3)	25 (58,1)
1. Weekly presence	21 (25,9)	9 (23,7)	12 (27,9)
2. Less than weekly presence	12 (14,8)	6 (15,8)	6 (14,0)
3. No presence	2 (2,5)	2 (5,3)	0 (0,0)
Missing	135		
Type of informal caregiving, n(%)			
0. Partner	31 (39,7)	16 (43,2)	15 (36,6)
1. Child	34 (43,6)	16 (43,2)	18 (43,9)
2. Other	13 (19,5)	5 (13,5)	8 (19,5)
Missing	138		
Medical/ nursing diagnosis			
Number of medical diagnosis, median(IQR)	1,0 (2,0)	1,0 (2,0)	1,0 (1,0)
Medical diagnosis (yes), n (%)			
0. COPD	48 (22,2)	25 (19,7)	23 (25,8)
1. Heart failure	44 (20,4)	27 (21,3)	17 (19,1)
2. Diabetes	41 (19,0)	23 (18,1)	18 (20,2)
3. Cancer	23 (10,6)	10 (7,9)	13 (14,6)
4. MS/ALS	1 (0,5)	1 (0,8)	0 (0,0)
5. Kidney disease	16 (7,4)	10 (7,9)	6 (6,7)
6. Rheumatism	6 (2,8)	3 (2,4)	3 (3,4)
7. Stroke	20 (9,3)	10 (7,9)	10 (11,2)
8. Other	82 (38,0)	53 (41,7)	29 (32,6)
Number of actual nursing diagnosis, median(IQR)	2,0 (2,0)	1,0 (2,0)	2,0 (3,0)
Number of potential nursing diagnosis, median(IQR)	0,0 (1,0)	0 (1,0)	1,0 (2,0)
Nursing diagnosis, n (%)			
0. Environmental domain	32 (14,8)	17 (13,4)	15 (16,9)
1. Psychosocial domain	113 (52,3)	57 (44,9)	56 (62,9)

2. Physiological domain	187	(86,6)	100	(78,7)	87	(97,8)
3. Health related behaviours domain	165	(76,4)	89	(70,1)	76	(85,4)
Number of goals in care-plan, median(IQR)	2,0	(2,0)	1,0	(2,0)	2,0	(3,0)
Amount of care						
Length of care, median(IQR)	45,0	(67,0)	45,0	(67,0)		*
Return care within six months (yes), n (%)	57	(26,4)	57	(75,7)		*
Missing	3					
Increase in amount of care (yes), n (%)	127	(58,8)	71	(55,9)	56	(62,9)
Decrease in amount of care ^a , median(IQR)	109,0	(205,0)	101,0	(211,0)	130,0	(200,0)
Increase in amount of care ^b , median(IQR)	84,0	(171,0)	68,0	(155,0)	135,0	(225,0)
Amount of care delivered ^c , median(IQR)	161,0	(149,0)	138,0	(145,0)	189,0	(175,0)
Nurses						
Educational level of care-givers, n (%)						
0. > % RN ^d	85	(39,5)	60	(47,2)	25	(28,4)
1. > % RPN ^e	28	(13,0)	12	(9,4)	16	(18,2)
2. > % AN ^f	102	(47,4)	55	(43,3)	47	(53,4)
Missing	1					
Number of caregivers ^g , mean(sd)	12	(9)	10	(8)	14	(6)
Other						
Unplanned hospitalization (yes), n (%)	16	(19,3)	5	(12,5)	11	(25,6)
Missing	133					

a: increase of assigned amount of care in minutes per week between first and last available assessment b: decrease of assigned amount of care in minutes per week between first and last available assessment c: median amount of care delivered over the period of home-care (terminated care) or six months (no terminated care) in minutes per week d: RN= Registered Nurse (equals level-5 nurse) e: RPN: Registered Practical Nurse (equals level-4 nurse) f: AN: Auxiliary Nurse (equals level-3IG nurse) g: mean number of unique caregivers over the period of home-care/ six months.

Table 2 Univariate association with self-reliance

Indicator	OR	95% CI	P
1 Age (years)	0,979	0,949 - 1,009	0,174
2 Female	0,765	0,444 - 1,317	0,334
3 Living Status With other (yes)	1,027	0,429 - 2,455	0,953
4 Presence of informal caregiving (yes)	1,963	0,345 - 11,174	0,447
5 Intensity of informal caregiving			
0. Daily presence	-	- -	0,98
1. Weekly presence	0,89	0,32 2,53	0,83
2. Less than weekly presence	1,19	0,33 4,25	0,79
3. No presence	1.923.184.336,72	0 -	0,99
6 Number of medical diagnosis	0,917	0,722 - 1,166	0,481
7 Number of actual nursing diagnosis	0,762	0,651 - 0,891	0,001
8 Number of potential nursing diagnosis	0,941	0,778 - 1,138	0,532
9 Nursing diagnosis			
0. Environmental domain	1,312	0,617 – 2,789	0,481
1. Psychosocial domain	2,084	1,197 – 3,628	0,009
2. Physiological domain	11,745	2,715 – 50,816	0,001
3. Health related behaviours domain	2,496	1,239 – 5,028	0,010
10 Number of goals in care-plan	0,779	0,677 - 0,898	0,001

Table 3 Predictors of self-reliance of older people with a chronic illness receiving home-care

Indicator	B	OR	95% CI	P
Constant	0,29	1,33		0,416
1 Gender (female)	0,35	1,41	0,78- 2,57	0,260
2 Number of actual nursing diagnosis	-0,23	0,80	0,68- 0,93	0,006
3 Psychosocial domain (yes)	0,50	1,65	0,89- 3,05	0,111
4 Physiological domain (yes)	1,94	6,95	1,54- 31,23	0,012

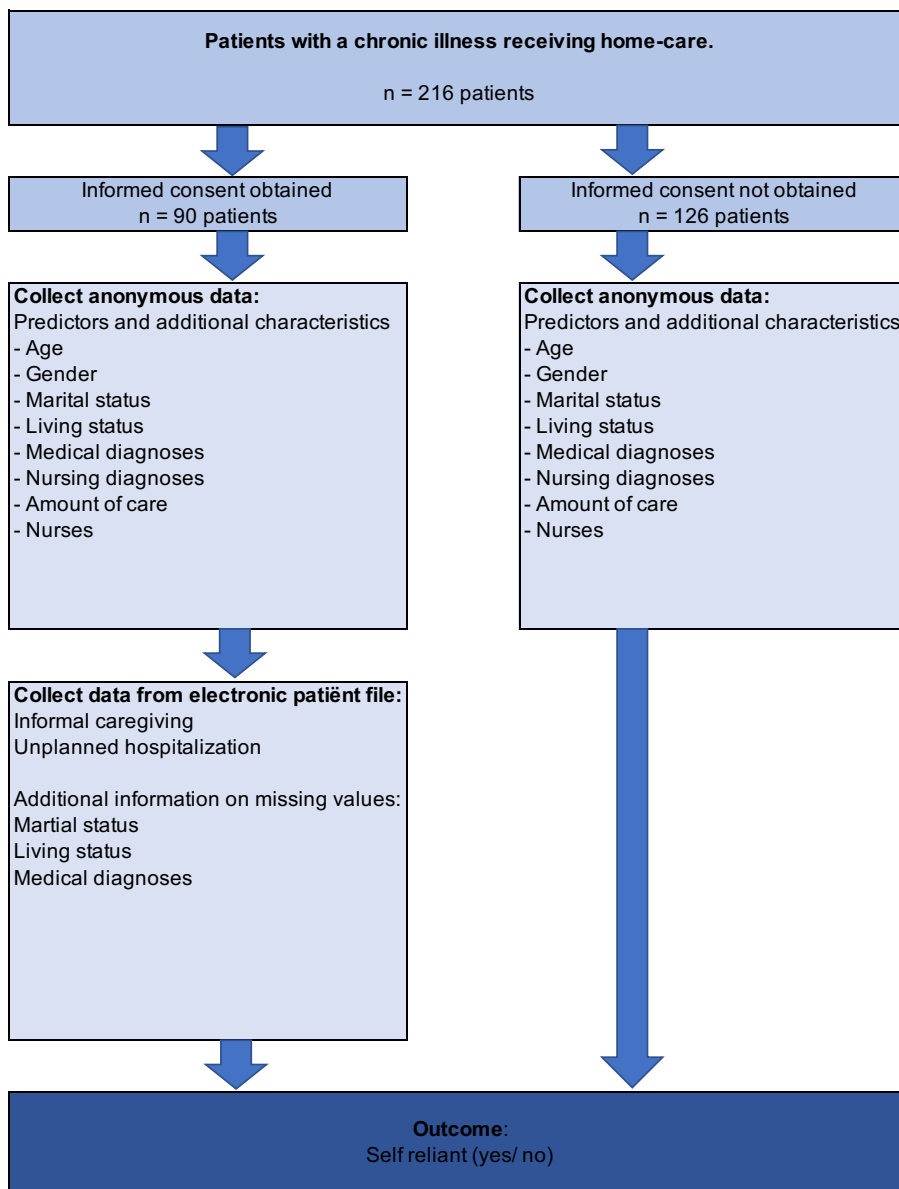


Figure 1 Flowchart of the study

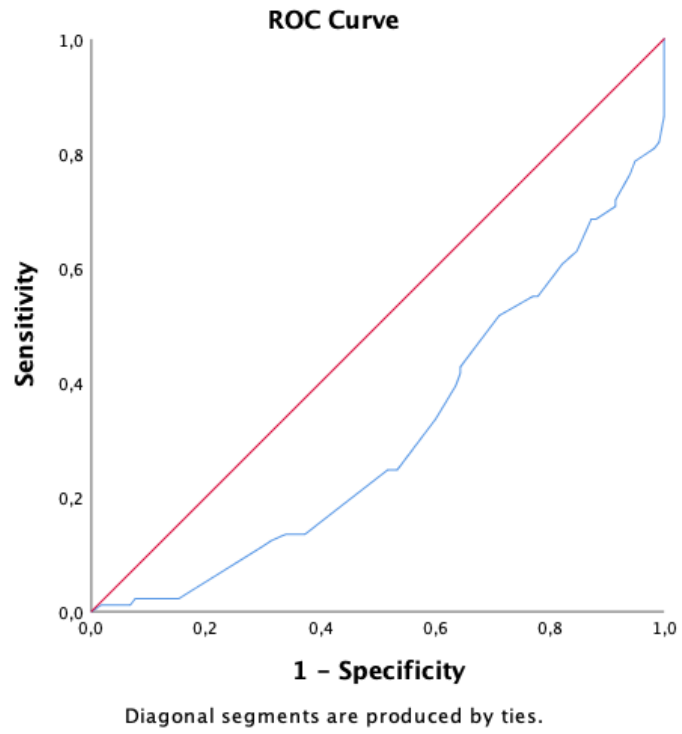


Figure 2 ROC- curve